Schmitt, Monja; Kleine, Lydia

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Monja Schmitt & Lydia Kleine

The Influence of Family-School Relations on Academic Success

Abstract

Coleman (1988, 1990) has formulated the assumption that social capital lies in social structures and facilitates certain actions such as the accumulation of human capital. Close social ties between actors in the educational environment should therefore exert independent effects on a child's academic performance. Considering the early selection into the different types of secondary education in the German education system after fourth grade, not only social relations at this decisive point in time become important, but also changes across time towards this transition. Therefore, using longitudinal data (from the BiKS-8-12 study) is of special advantage in this field of research which is dominated by cross-sectional analyses.

In this paper, we apply multinomial logistic regressions in order to investigate whether family-school relations are important for academic achievement: Independent effects of student-student, student-teacher, and parent-school relations could be found. Children with good social relations to their teachers and classmates, children with high performing friends, and parents who engage in school activities have significantly better chances in reaching a high performance level. Analyses with growth curve models show in addition that changes in student-teacher interactions, student-student interactions and changes in parental involvement contribute to a better school performance.

Keywords

social relations, social capital, longitudinal studies, academic achievement

Der Einfluss der Beziehungen zwischen Familie und Schule auf den Bildungserfolg

Zusammenfassung

Nach Coleman (1988, 1990) liegt Sozialkapital in sozialen Beziehungen und erleichtert bestimmte Handlungen, wie z.B. die Akkumulation von Humankapital. Enge soziale Bande zwischen Akteuren innerhalb des schulischen Handlungsfeldes sollten deshalb einen eigenständigen Einfluss auf Bildungserfolg nehmen. In Anbetracht der frühen Aufteilung in die verschiedenen Sekundarschulzweige nach der vierten Klasse innerhalb des deutschen Bildungssystems werden nicht nur die sozialen Beziehungen zu diesem Zeitpunkt relevant, sondern auch Veränderungen in diesen Beziehungen bis zu

diesem Zeitpunkt. National und auch international liegen nur wenige längsschnittliche Ergebnisse innerhalb dieses Forschungsfeldes vor. Unter Verwendung von Daten der Forschergruppe BiKS wird daher mittels multinomialer logistischer Regressionen untersucht, ob sich unabhängige Effekte enger Beziehungen unter Schülern, zwischen Schülern und Lehrern sowie für das schulische Engagement der Eltern finden lassen: Kinder mit guten sozialen Beziehungen zu ihren Klassenkameraden und Lehrern, mit leistungsstarken Freunden und Eltern, die sich für schulische Belange engagieren, haben bessere Chancen, ein höheres Notenniveau zu erreichen. Mithilfe hierarchischer Wachstumskurvenmodelle wird zusätzlich gezeigt, dass auch Veränderungen der Beziehungen zwischen Schülern und Lehrern und zwischen den Schülern untereinander sowie des elterlichen Engagements mit Bildungserfolg zusammenhängen.

Schlagworte
Soziale Beziehungen, Soziales Kapital, Längsschnittstudien, Bildungserfolg

1. Introduction

Repeatedly, empirical research has revealed the persistence of educational inequalities (e.g., Baumert et al. 2001; Prenzel et al., 2004; Becker, 2004) with a main focus on effects of children's background on transitions to higher secondary schooling. These findings regard the influence of family background variables like parental socio-economic and educational status (e.g., Blossfeld, 1993; Müller & Haun, 1994; Schimpl-Neimanns, 2000) and migration background (e.g. Kristen 2002; Relikowski, Schneider, & Blossfeld, 2009) as well as compositional factors such as regional provenance (e.g., Henz & Maas 1995; Ehmke, Siegle & Hohensee, 2005), the institutional environment (e.g., Below, 2002), educational recommendations (e.g., Bos et al., 2004; Ditton, Krüsken, & Schauenberg, 2005), or the school class context (e.g., Kristen, 2002) on different educational transitions. For the German education system the transition after fourth grade to secondary schooling is one crucial stage which strongly determines the achieved level of education (e.g., Blossfeld, 1988, 1993), as only rare upgrade or revision could be observed in the further course of educational careers (e.g., Hillmert & Jacob, 2005). Furthermore, in the German school system, the decision which school track to choose after fourth grade is mainly determined by the grade point average or, respectively, the achieved level of grades. Especially in Bavaria, grade limits are of crucial importance for the available options attending one of the three main tracks: the low vocational track (*Hauptschule*), the intermediate vocational track (*Realschule*), or the academic school track (*Gymnasium*). According to the regulations, a high level of performance is reached at a grade point average concerning the school subjects mathematics, German, and social studies of 1.0 to 2.33, which displays the grade range allowing for *Gymnasium*. An intermediate level of performance is a grade point average of 2.67, as the upper limit for attending *Realschule*, and a low level of performance means a grade point average of 3.0 or worse, which limits the students to attend *Hauptschule* (Sekretariat der Ständigen Konferenz der

Kultusminister der Länder in der Bundesrepublik Deutschland, 2006). Thus, not only the actual grade point average is decisive, but also the level in which this grade average lies.[1] In consequence we use both, the achieved grade level and the average grade points in the relevant subjects to measure academic achievement.

Besides the mentioned effects and the specifications of the German education system, social capital is another important resource for predicting academic success and gets determining in crucial stages of the educational career: Children from families with high social capital reach better school grades as well as better competence test scores and stay longer in school (e.g., McNeal, 1999; Teachman, Paasch, & Carver, 1996). One of the most prominent explanations for the relevance of social closure and its underlying mechanisms for academic success is contributed by the work of James Coleman (1988, 1990), who postulates an independent function of social capital. In the eyes of Coleman social capital lies in social structures and facilitates certain actions such as the accumulation of human capital: With close social relations, information exchange and support in school-related tasks like supporting children's homework becomes easier. Also, the establishment of norms and expectations like parental educational aspirations have an influence on academic success.

Following the theoretical assumptions and empirical results of Coleman, this paper focuses on the question whether the relations between individual actors in children's educational environment have an influence on educational success in advance of the transition to secondary education. Therefore we investigate relations between students, teachers, and parents. Due to the fact that these actors are increasingly concerned with the upcoming educational decision the closer the time of transition approaches (e.g., Büchner & Koch 2001; Pohlmann, 2008), and that it can be assumed that social relations between the relevant actors are especially important during this sensitive period and may change with increasing proximity of the decision, we investigate social relations in the middle of fourth grade as well as changes in social relations from third to fourth grade. The analyses employ longitudinal data from the research group BiKS8-12.[2] The advantages of this longitudinal design should be emphasized.

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1 In Bavaria, students need a grade point average of at least 2.33 to be allowed to attending the higher school track, the *Gymnasium*; a grade point average of the grades for the subjects German and Mathematics of not at least 2.0 means a conditional adequacy. Adequacy for the middle school track, the *Realschule*, exists if the grade point average has a value of at least 2.33; a value of 2.66 stands for conditional adequacy for middle school track. Students who are not qualified for transiting to a certain track, but whose parents wish for that track, attend class on trial.

2 The study presented is conducted in subproject 1 (primary investigators: Prof. Dr. Cordula Artelt; Prof. Dr. Hans-Peter Blossfeld; Prof. Dr. Gabriele Faust; Prof. Dr. Hans-Günther Roßbach; Prof. Dr. Sabine Weinert) (RO-820-12), and subproject 5 (primary investigators Prof. Dr. Hans-Peter Blossfeld; Prof. Dr. Jörg Doll) (BL-381-3), focusing on sociological research questions. The subprojects are part of the larger interdisciplinary research group BiKS, funded by the German Research Foundation (FOR 534). We would like to thank all participating children and their parents, elementary, and secondary school teachers, as well as all students engaged in data collection for their most active cooperation.

In the following, we first introduce the theoretical background for our analyses and refer to the state of research on our topic. Then, we describe the database for our analyses, the variables used and the methods applied. The results of our analyses we display thereafter will reveal whether social relations have independent effects on the level of school performance and on changes in academic success. We conclude our paper with an interpretation and discussion of our findings.

2. Theoretical Background and Empirical Implications

2.1 Theoretical Background

According to Coleman (1988, 1990), social capital is a resource embedded in social relations between different actors. In his theoretical considerations, Coleman distinguishes between certain characteristics of social relations as driving forces of action. Coleman regards a sense of trust in the reciprocity of a relation between two actors as especially important, which entails a belief that the relation is important for both actors and consists of expectations and obligations. Moreover, social relations are utilized as valuable channels for information and produce shared norms as well as sanctions, which can be useful in processes of action. Furthermore, Coleman explains that a social relation needs to be close and embedded in the appropriate context in order to create social capital. According to Coleman, social capital is the third important resource besides economic resources and human capital, and indicates a child's social background. Social capital is not necessarily connected to the family's economic resources or human capital and therefore exerts an independent effect on children's school performance. Thus, children from non privileged backgrounds can profit from close and strong social ties.

In line with his general theoretical assumptions, Coleman emphasizes the relevance of families' social capital (besides parental economical and human capital) for a child to acquire human capital. In this context, Coleman distinguishes between social capital within the family and social capital between the family and the family's environment. With regard to the latter point, Coleman illustrated the importance of social relations between the family and the family's academic environment by revealing the relevance of this relation for the creation of human capital by generating intergenerational closure over many contacts to different actors. A strong and close relationship between parents, children and teachers creates a climate of discipline and trust, which is beneficial for children's learning progress. Another positive effect of good contacts between students, teachers and parents is that of a more efficient support in school-related matters and an enhanced exchange of information relevant for academic achievement. Moreover, a climate of good contacts and relationships with others helps establishing shared norms and values, for instance the perception of good grades as a valued and desired outcome.

Besides, strong and close relations between parents and teachers foster expectations for rewards, such as better grades for students with committed parents.

2.2 State of Research

Coleman and his colleagues (1982, 1987) report that students from catholic private schools outperform students from public schools. Coleman et al. assume as a reason that in catholic private schools, the bonds between teachers, parents, and students are tighter. This social capital is found to have independent effect on school dropouts, as public schools have higher dropout rates than catholic private schools. Many researchers followed the work of Coleman and his colleagues and numerous analyses on the relevance of social relations for academic success were conducted. Muller (1993), for example, confirmed Coleman's findings of catholic schools exerting independent significant effects on achievement test scores. Kim and Schneider (2005) investigated the relevance of generational closure around school for the continuation of formal education. They showed that the number of a child's closest friends as well as the number of parental acquaintances with the parents of the child's friends effects the continuation of postsecondary education. Morgan and Sørensen (1999) also looked at generational closure around school by generating a numerical index integrating the students' friendships with the parental contacts to school. Unlike Kim and Schneider (2005), they found no overall effect of generational closure on academic success measured by students' competencies in mathematics. This is due to the reverse effects emanating from the items implemented in the scale: Closure among students correlates positively with student competencies in mathematics, whereas closure among parents correlates negatively with these competencies. However, when selecting only catholic schools from the sample, the analyses of Morgan and Sørensen confirmed a positive influence of closure among parents as evidenced by Coleman.

With regard to closure among students as well as relations between students and teachers in class, a large body of research exists on the relations of classroom climate and educational outcomes. Satow and Schwarzer (2003), for example, found that the classroom climate perceived by the students (operationalized as the overall climate, which was assessed by four scales in a questionnaire) affects the children's self-efficacy expectations, which in turn are important for academic success (e.g., Zimmermann, 1998). Other authors distinguished between social relations among students and between students and teachers as, for instance, Israel and Beaulieu (2002): Participation in students' organizations and positive student-teacher interactions correlate positively with student achievement. Likewise, Jungbauer-Gans (2004) showed in her analyses that children who reported a strong feeling of allegiance in class have better reading competencies, whereas a poor disciplinary climate within class, as well as high performance pressure, decrease achievement. Carbonaro (1998) found negative effects of class skipping, absenteeism and suspensions on test scores in mathematics and on contin-

uing the educational career. These tendencies can be explained by weak ties to classmates and teachers and by peer influence on the students' norms and values. Furthermore, the chance of attending a two year or a four year college versus not enrolling in college at all, relates to the share of friends with ambitious plans towards their own educational careers. Even when the students' friends do not aspire an extended educational career, this positive effect remains as long as a high share of students in school has college aspirations (Perna & Titus, 2005). In sum, the results seem unambiguous: Bonds between teachers and students and among students matter for school success, regardless of which indicator for academic success is applied. One crucial question that remains unanswered in these previous studies concerns the direction of these effects: Does academic success influence behavior like absenteeism or is the effect reversed? And: Do successful students look for successful friends and establish better relationships with their teachers, as several studies suggested? Or, in reverse, do good relations to teachers and having high achieving friends contribute to students' school success? The analysis of Perna and Titus (2005) provide first evidence: While controlling for the child's academic achievement, Perna and Titus still found an impact of social relations on continuing formal education. However, longitudinal research has to be applied to be able to study causality.

With regard to social closure among school, not only the relations between children and to their teachers matter, but also the relations between parents. Carbanaro (1998) reveals that children whose parents know the parents of their child's friend have higher chances of continuing formal education, whereas parental closure has no effects on reaching higher test scores in mathematics or on school grades. In contrast, Israel, Beaulieu and Hartless (2001) found that parents who know their child's best friend's parents have children who reach higher test scores, better grades, and remain longer in school education. Muller (1993) confirmed these findings with regard to test scores and grades. Regarding growth in mathematic competencies, analyses by Hofman, Guldemond, and Dijkstra (1996) revealed positive effects for establishing a network between parents of children at the same school. This contradicts the above mentioned findings by Morgan and Sørensen (1999) that showed a negative effect for closure among parents on gains in mathematic competencies. With regard to a prolonged school enrolment, Kim and Schneider (2005) found a positive influence of having conversations with other students' parents, whereas Perna and Titus (2005) reported no effect when controlling for achieved test scores. These results seem more or less puzzling and the question whether ties between parents are helpful in the educational career of a child remains largely unanswered. Nevertheless, it can be concluded that with regard to continuation of school career and achievement of grades at least no negative effects are accounted for. Influences are reported under control of the families' resources; thus, ties not only occur among higher educated parents or among parents with a higher socioeconomic status. Again, it needs to be considered that possibly only parents with successful children establish such school-related networks – as the analyses by Perna and Titus (2005) may indicate. In contrast, other au-

thors (e.g., Hofman, Guldemond, & Dijkstra, 1996; Muller 1993) find an impact of social relations on academic success when controlling for achievement or competence scores.

With respect to the ties between parents and teachers, many authors could show that parental involvement in school, like volunteering or attending parent-teacher conferences, predicts academic success (e.g., Israel & Beaulieu, 2002; Lee & Bowen, 2006; McNeal 1999; Paulson, 1994; Parcel & Dufur 2001; Rumberger, Ghatak, Poulos, Ritter, & Dornbusch, 1990; Stocké, 2009). However, for this kind of ties, results are most controversial. Perna and Titus (2005) reported positive effects of parental help in school on the chance for their children to enroll in post-secondary education. This effect remains significant under control of the students' test scores and school level, which means, even when the child's parents are not involved in school, a high number of other active parents in school increases the chance of continuing the educational career. Kim and Schneider (2005), too, found positive effects of parent-teacher contacts on the chance to enroll in higher education controlling for the child's test score. Moreover, Teachman, Paasch and Craver (1997) analyzed the chances of staying in school and found a negative relation between the intensity of parental contact to school and dropping out, but when controlling for intrafamilial social relations, this effect vanished. Catsambis (2001) controlled for eighth grade test scores and a cumulative GPA and found a positive effect on high school credits completed by 12th grade, when students' parents supported the school and participated in parent-teacher-organizations. However, reverse effects were found for the number of parent-teacher conversations. This is confirmed by Hofman, Hofman, Guldemond, and Dijkstra (1996) showing positive effects of parents' school related knowledge on competence gains in mathematics and a negative effect of the intensity of parent-school contact. In line with these results, McNeal (1999), Ho Sui-Chu, and Willms (1996), as well as Ream and Palardy (2008) evidenced a negative relation between contact intensity to school and competencies in mathematics, reading, and sciences. On the contrary, Ho Sui-Chu and Willms (1999) showed a positive effect of volunteering in school and being part of parent-teacher associations on achievement in mathematics and reading. They stated, even when schools differ in their parental involvement, the involvement on the individual level is of much higher importance. Anderson (2008) reported a positive correlation between the number of telephone talks between parents and teachers and the child's verbal competencies, but admitted that this relation was not found for mathematic competencies. Pong (1998) neither found an influence of voluntary parental support of teachers nor an influence of engagement in parent-teacher associations on competencies in reading and mathematics. Likewise, Domina (2005) investigated competence achievement under control of the competence starting level and just as well could not identify effects for visiting parent-teacher conferences, volunteering in school, or being part of parent-teacher associations. However, what could be found is an influence on behavioral problems, which is an indicator for long term effects. Although, these results do not add up to a clear picture, some general tendencies can be observed: According to

Fan and Chen (2001), who conducted a meta-analysis, the relationship between parental involvement and students' academic achievement is stronger when academic achievement is represented by a more global indicator of academic achievement (e.g. school GPA) rather than by academic subject-specific indicators (e.g., mathematics grade). Additionally, it seems likely that the frequency of parental school contacts tends to have negative associations with academic success, whereas parental engagement like volunteering in most cases showed positive correlations. Again, the question remains whether higher educated parents with a higher socioeconomic status and/or with high performing children are more willing to establish and retain contacts to school. Although various authors like Kohl, Lengua, and McMahon (2000) reported that parental human or economic capital correlates with the way parents are engaged in the school context, it should be noted that all mentioned studies control for family background characteristics and thus, net effects for social relations are reported.

2.3 Research Questions

Despite the ambiguous results in present research, four general implications can be drawn: First, it is crucial to distinguish between different ties among actors; second, academic success should be measured by various dependent variables; third, it is of interest, whether differences in the strength of ties between schools play a role with regard to academic success; and fourth, it is necessary to apply longitudinal research.

Additionally, it is important to consider at what stage in the educational career children are observed and which education system is focused on during the analyses. Most of the mentioned studies had no focus on the importance of crucial stages during the educational career. For the German education system, where analyses on social closure in the field of educational sociology are rare, one crucial stage is the transition to secondary education, especially in federal states like Bavaria where the teacher's recommendation, which is mainly determined by the attained grade level, is binding.

According to the theoretical assumptions, the implications of the empirical results and the specifics of the German education system, the following research questions will be investigated by analyzing children in Bavaria before their transition to secondary schooling: Do students with high-performing friends have better school grades? Are good relations to classmates and teachers beneficial for school performance? Is there a positive relation between parental school involvement and children's grades? Is there a positive net effect of social relations on school success when family background characteristics are taken into account? Can children from less privileged backgrounds profit from social closure? In how far is the causality problem between social relations and school success responsible for these effects? Do these effects only occur due to differences on school level?

Additionally, a second set of research questions emphasizes the point in time when the interactions between students, parents, and teachers were observed: Are changes in parent-teacher, student-student, and student-teacher interactions observable the closer the transition to fifth grade approaches? If so, do changes in social relations affect changes in academic success?

3. Data and Methods

3.1 Sample

The BiKS research group (*BiKS: Bildungsprozesse, Kompetenzentwicklung und Selektionsentscheidungen im Vor- und Grundschulalter*, trans.: "Educational processes, competence development and selection decisions in pre- and primary school age") was founded as an interdisciplinary team of sociologists, educational scientists, and psychologists at the University of Bamberg with the purpose to conduct research on circumstances leading to children's educational outcomes. BiKS analyzes educational processes of children at age 3 to 12. This age span is covered by two longitudinal studies. The first study BiKS-3-8, follows children from the beginning of preschool (at about age 3) until the end of second grade in elementary education. The second longitudinal study BiKS-8-12 observes children from third grade primary school until seventh grade secondary school. Starting point of the sampling procedure was the choice of the federal states Bavaria and Hesse, which are characterized by different institutional settings in terms of their education systems. Thereafter, urban and rural areas were selected by disproportionally stratified procedures. The sample of Kindergartens in BiKS-3-8 was also drawn disproportionally stratified. The primary schools of BiKS-8-12 were drawn by linked selection to the Kindergartens of BiKS-3-8 (Kurz, Kratzmann, & Maurice, 2007).

For the analyses, data from BiKS-8-12 are used. The longitudinal study BiKS 8-12 started in spring 2006 and assembles 2395 students from 155 different classes in 82 different schools at that time. Due to the sampling design, two thirds of the families live in Bavaria, one third in Hesse. In fall 2007, the students left elementary school and entered different tracks of secondary education. The study focuses on the main three school tracks prevailing in Germany, which are hierarchically stratified by their academic requirements: *Gymnasium*, *Realschule*, and *Hauptschule*. The children's parents and teachers are surveyed as well (Maurice et al., 2007).

We use data from waves one to three investigating 1556 children from Bavaria: With regard to the families' socio-economic position, 38 % of the interviewed households reach ISEI values (International Socio-Economic Index of Occupational Status, see Ganzeboom, de Graaf, & Treiman, 1992) in the lower quartile, whereas for 64 % of the households, values in the upper quartile could be observed. 28 % of the children are from families with a low level of education, and about 31 % of families have a medium educational level, and respectively about 40 % are of a high

educational background. About 80 % of families are native Germans without a migration background (see Table 1).

Table 1: Selected Sample Characteristics (BiKS-8-12)

	Bavarian pupils in Wave 1
Sample size	1556
Sex	51.9 % male 48.1 % female
ISEI	Mean = 50.56; Min = 16; Max = 90; *SD* = 16.39 Percentiles: 25 = 38 %; 50 = 51 %; 75 = 64 %
Highest educational level in the household	28.3 % low level 31.5 % medium level 40.2 % high level
Migration background	80.0 % no migration background 20.0 % at least one parent born abroad

3.2 Instruments and Central Variables

Until mid-2009, five measurement points were realized within BiKS-8-12. The analyses presented here refer to data from wave one (March 2006, middle of third grade) to wave three (March 2007, middle of fourth grade). Thus, we look at students at an early, but crucial stage of their educational career: Before entering secondary school, grade levels are of crucial importance for the children's educational opportunities. From the parental interviews, relevant indicators for social capital and background information on socio-economic position and education were retrieved. Besides the students' survey data collected in the class context, additional information on school grades and the number of students in class was given by their teachers. Thus, our analyses can not only take into account the relation between students (reported by the children) and between students and their teachers (reported by the children), but also the relations between parents and the school (reported by the parents).

The following indicators applied in our analyses are taken from the FEESS 3-4 study (Rauer & Schuck, 2003): "student-student interaction" (social integration) and "student-teacher interaction" (feeling of acceptance), both of which are indicative of the quality of social relations between the relevant actors from the child's point of view, whereas "number of students in class" displays the quantity of possible social relations within class. These indicators allow integrating the perceptions of how students and teachers interact as well as the opportunities of interactions. "Number of friends planning to attend a *Gymnasium*" indicates another school-related qualitative aspect of the students' social relations and represents the value of high academic achievement among the students and their friends. In addi-

tion, the "parent-school interaction" is considered as measured by the parents' contact to school. A good contact to school can contribute to a better relation of the parents to the teachers of their child, and also to other engaged parents. Such relationships may, in turn, establish shared norms and values and serve as information channels.

The explanatory variables considered in our analyses consist of the following items:

- Student-student interaction (child's point of view):
  My classmates are nice to me; I get along well with my classmates
  (1 = *"not true" to* 4 = *"true")* (in waves one, two and three)
  (internal consistency [Cronbach's α] of the two items: in wave one: .724; in wave two: .763, in wave three: .801)

- Student-teacher interaction (child's point of view):
  My teachers are fair to me; My teachers like me; My teachers care for me; My teachers dress me down too often; My teachers help me whenever necessary
  (1 = *"not true"* to 4 = *"true") (in waves one, two, and three)*
  (internal consistency of the six items: in wave one: .774; in wave two: .792, in wave three: .838)

- *Number of students in class* (teacher's point of view) (in waves one, two, and three)

- *Number of friends planning to attend a "Gymnasium"* (= academic school track) (parental point of view)
  (1 = *"none"* to 5 = *"all") (in wave three)*

- Parent-school interaction (parental point of view):
  I help organizing school festivities; I am active in the parents' association
  (1 = *"no engagement"* to 2 = *"full engagement") (in waves one and three)*
  (internal consistency of the two items: in wave one: .426; in wave three: .407)

With regard to the quality of the indices, the internal consistencies of the index "student-student interaction" and "student-teacher interaction" are very satisfying and sufficient for the index "parent-school interaction" considering the small number of items.

Furthermore, the item structure found via factor analyses is evidenced in all analyzed waves for all indices. All items show sufficient variance; the values of "parent-school interaction", "number of children in class", and "number of friends planning to attend a *Gymnasium*" are normally distributed, whereas the values of "student-student interaction" and "student-teacher-interaction" show different response patterns (right skewed distribution). However, this is unproblematic as all cells contain sufficient case numbers.

3.3 Method

As explained above, in the German school system, the decision which school track to choose after fourth grade is mainly determined by the grade point average attained by the students or, more precisely, by their reached level of grades. Thus, the first of our analyses presented here concentrate in a cross-sectional perspective on the influence of social relations on academic success at this crucial stage. As not the actual grade point average is decisive, but the level or range within which this grade average lies, the dependent variable is not operationalized as a metric variable (GPA), but as three levels of performance. As the three school tracks represent different, hierarchically ordered options, the dependent variable should not simply be measured as a binary variable, but rather three levels should be compared separately using multinomial logistic regression analyses.

In contrast to Bavaria, in Hesse, these regulations of grade levels and teacher's recommendations are not binding. Therefore, Hessian parents eventually decide which track to choose for their children (Sekretariat der Ständigen Konferenz der Kultusminister der Länder in der Bundesrepublik Deutschland, 2006). Thus, only students in the federal state Bavaria are included in these analyses.

In accordance with the theoretical considerations by Coleman, we take the highest level of secondary education in the household into account in order to operationalize the families' human capital (graduation from academic track "Abitur" vs. all others). From a theoretical perspective, the families' income should be included as an indicator of financial resources. Due to the high number of missing values in the income variable[3], economic recourses are operationalized by the highest ISEI score in the household. Additionally, as familial resources may differ between migrants and natives, the migration background is controlled for.

With regard to methodology, it is frequently pointed out that cross-sectional research designs are disadvantageous to longitudinal designs, as the former approach is unable to take into account the causal direction of effects (for an overview, see Dika & Singh 2002). Therefore, cross-sectional analyses cannot provide an empirical answer to the question whether a child's school performance affects the quality of social relations between actors or whether the reverse is the case. A longitudinal research design as applied in BiKS gives the opportunity to first control for the child's grades the preceding wave (which is done in the multinomial logistic regressions we present further below) and thereafter to analyze individual change over time. Therefore, we estimated a three-level random slope model. Besides the consideration of the individual development, the school class is considered as third level. In this growth curve analysis, the average grade level of the three waves is included as the dependent variable; these analyses allow us to investigate an overall pattern of change over time as well as the effects of explanatory variables on the temporal pattern.

3 Only about 65.9 % (1026) of the participating parents gave statements on their salaries, whereas the ISEI could be generated for almost 93 % (1474) of the participants.

4. Results

4.1 Effects of Social Relations on Academic Success

First, we estimate effects of social relations on the level of grades at mid fourth grade by applying multinomial logistic regression models which account for differences clustered in classes. Subsequently, we analyze whether effects of these relations still show after controlling for economic resources, human capital and migration background. We include 924 cases in our analyses. The substantial difference in case numbers between the starting sample and the cases available for analyses is due to missing data in the CATI interviews held with parents, and the written questionnaires for students and teachers, and also due to sample attrition between waves one, two, and three.

In Table 2 odds ratios are displayed. Values greater than 1 represent a higher chance to reach a high level of performance than to achieve an intermediate or low level of performance, whereas values between 0 and 1 indicate a lower chance of having a good school performance. Models 1.1 and 1.2 show that children with good social relations to their classmates and teachers have significantly better chances to reach a high performance level, whereas the number of students in class shows no statistically significant effect. Also having high performing friends and parents who engage in school activities contribute positively to performing well in school.

Additionally, in model 2.1 and 2.2, family resources and migration background are considered. It can be observed that in these two models the effects shown in models 1.1 and 1.2 are only slightly weaker. The integration of interaction effects into models 4 and 5 confirms the hypothesis that effects of social relations are not bound to economic or human capital – nevertheless in model 4.2, the interaction effect of the educational background and the parent-school interaction is significant. This means that close contacts of highly educated parents to the school their child attends has a positive effect on the child's academic performance. It should be pointed out that effect sizes of social relations on reaching a certain level of grades are comparable to those of economic resources and human capital. Moreover, about 8 % of the variance is explained by indicators of social relations, whereas social capital and family background variables explain 15 % of the variance. Therefore, social relations play no inferior but an independent role in explaining academic success. Migrants have worse chances to achieve high grade levels (compared to low grade levels). This effect interacts with the student-teacher relation, as shown in model 5.1. The main effect of migration refers to parents without migration background and rises substantially in comparison to the previous models. Children without migration background show a 21 times better chance to reach a performance level which allows for *Gymnasium* instead of *Hauptschule*. For children with migration background, the effect of student-teacher interaction does not help to reach a better grade level. Moreover, good relations between students and teachers as well as parents and teachers seem to be more important when comparing a high and a middle level of academic performance, whereas the

Table 2: Social Relations and Level of School Performance by the Middle of Fourth Grade. Results from Multinomial Logistic Regression Analyses (odds ratios; standard errors in parantheses)

	Model 1.1		Model 1.2		Model 2.1		Model 2.2		Model 3.1		Model 3.2		Model 4.1		Model 4.2		Model 5.1		Model 5.2	
	high vs. low performance		high vs. middle performance		high vs. low performance		high vs. middle performance		high vs. low performance		high vs. middle performance		high vs. low performance		high vs. middle performance		high vs. low performance		high vs. middle performance	
Student-teacher interaction	1.19	(.20)	1.48*	(.28)	1.07	(.20)	1.42^{+}	(.28)	0.69	(.16)	1.12	(.25)	1.83	(1.29)	1.81	(1.22)	1.19	(1.18)	1.26	(.88)
Number of students	1.03	(.02)	1.03	(.03)	1.04	(.03)	1.04	(.03)	0.96	(.03)	1.00	(.03)	1.04	(.03)	1.03	(.03)	0.96	(.04)	1.00	(.03)
Student-student interaction	1.50**	(.18)	1.29	(.22)	1.44**	(.17)	1.29	(.22)	1.50**	(.24)	1.36^{+}	(.25)	2.06	(.94)	2.29	(1.28)	1.97	(1.19)	2.54^{+}	(1.44)
Number of friends going to attend Gymnasium	2.10**	(.19)	1.57**	(.20)	1.70**	(.16)	1.42**	(.18)	1.33*	(.16)	1.29*	(.16)	1.67	(.60)	1.41	(.51)	0.93	(.42)	1.08	(.41)
Parent-school interaction	1.71^{+}	(.49)	2.30*	(.77)	1.54	(.49)	2.26*	(.77)	1.17	(.50)	2.05*	(.70)	3.52	(3.52)	7.31	(9.40)	1.96	(2.66)	5.15	(6.71)
Educational background: Gymnasium					3.50**	(.92)	1.99**	(.50)	2.80**	(1.02)	1.77*	(.44)	11.25	(22.76)	0.13	(.25)	38.64	(103.24)	0.27	(.57)
Socio-economic position					1.04**	(.01)	1.01	(.01)	1.03**	(.01)	1.01	(.01)	1.10^{+}	(.06)	1.11*	(.06)	1.04	(.61)	1.08	(.06)
Migration background					0.48**	(.13)	1.17	(.41)	0.52^{+}	(.20)	1.18	(.47)	7.26	(12.47)	4.17	(9.15)	21.03^{+}	(37.81)	9.70	(20.65)
Level of grades middle of third grade									.07**	(.01)	0.27**	(.04)					0.06**	(.01)	0.27**	(.04)
Student-teacher interaction*education													0.49	(.26)	1.30	(.71)	0.49	(.33)	1.14	(.75)
Student-student interaction* education													1.01	(.32)	0.98	(.46)	0.90	(.43)	0.99	(.49)

Table 2/cont.

Table 2 (Cont.)

Number of friends* education							1.02	(.83)	1.15	(.28)	0.89	(.27)	1.11	(.27)
Parent-school interaction* education							1.08	(.26)	4.12^{+}	(3.11)	0.63	(.73)	2.86	(2.25)
Student-teacher interaction*ISEI							1.00	(.02)	0.99	(.02)	1.00	(.02)	1.00	(.02)
Student-student interaction*ISEI							0.99	(.01)	0.99	(.01)	1.00	(.01)	1.00	(.01)
Number of friends*ISEI							1.00	(.01)	0.99	(.01)	1.00	(.01)	1.00	(.01)
Parent-school interaction*ISEI							0.98	(.02)	0.97	(.03)	0.99	(.03)	0.97	(.03)
Student-teacher interaction* migration							0.31^{+}	(.19)	1.64	(.99)	0.31^{+}	(.21)	1.36	(.91)
Student-student interaction* migration							1.19	(.36)	0.81	(.40)	0.54	(.20)	0.59	(.32)
Number of friends* migration							0.91	(.24)	0.99	(.38)	0.79	(.28)	0.88	(.33)
Parent-school interaction* migration							0.57	(.39)	0.36	(.32)	2.44	(1.92)	0.75	(.66)
Pseudo R^2	*.078*		*.078*		*.153*		*.153*		*.401*		*.401*		*.165*		*.165*		*.411*		*.411*	

Note. n=924; ** p < .01; * p < .05; $^{+}$ p < .10. Standard errors are adjusted for 87 clusters (school classes).

relations between students become more relevant when looking at high versus low levels of performance.

In models 3.1 and 3.2, the student-teacher relation is not significant, meaning that this kind of interaction has no effect on a change in reaching grade levels or that the effect only occurs because better performing students have better relations to their teachers. The student-student interaction and the parent-school interaction, instead, remain significant in their effects on academic success.

All in all, independent from familial resources, social relations exert positive effects on children's school grades: children who have good relations to their classmates as well as to their teachers, children whose friends show high performance in school, and children whose parents are greatly involved in school issues have better chances to reach a high level of performance in middle of fourth grade. The hypothesis that the number of students in class influences the quality of social relations and therefore reduces the chances of academic success could not be supported.

4.2 The Meaning of Changes in Social Relations

Table 3 shows how changes in social relations within one year affect children's performance level. With this focus on change, the research questions are accordingly analyzed by estimating hierarchical growth-curve models with random intercept and random slope. This method allows us to estimate changes over time: The Grade Point Average (GPA) in the school subjects German, mathematics, and social studies is then specified as a function of time. These longitudinal competence levels represent the first level nested within students. At the third level students are nested within classes.

The first model contains only the intercept term. The value of 2.45 is the average GPA across all students and all three measurement points from third to fourth grade. The intraclass correlation at the person level (2nd level) is estimated as .79. This means that nearly 80 % of the variance is variance between students. The intraclass correlation at the class level (3rd level) still explains five percent of the overall variance.

First of all (model 1), we see that students get better grades over time. For interpretation, it is important to note the following relation: the lower the GPA turns out over time, the better the school performance of the student (1: very good – 6: failed). Due to the increasing proximity of the time of transition to secondary school, we expect a stricter grading policy by the teachers and thus worse grades, which we can observe after introducing other predicting indicators. Interpreting the random effects, we observe that the intercept on the students' level varies between the grades 1.9 and 3.1. A sizeable variation can be found as well within the temporal pattern. However, we do not only see worse grades over time but we can also observe improvements. The variation of the intercept and slope on the class level is lower, but here we find positive and negative developments, too.

Table 3: Hierarchical Growth Curve Models with Random Intercept and Slope on the School Performance during Primary School

Model Parameters	Null-model		M1 + time random		M2+ social capital		M3+ individual characteristics	
	coeff.	*SE*	coeff.	*SE*	coeff.	*SE*	coeff.	*SE*
Fixed Part Predictor								
Intercept	2.45	.03	2.49	.03	3.34	.19	3.79	.18
Time			-.01**	.02	.14**	.03	.12**	.03
Student-teacher interaction				-.08**	.03	-.06*	.02	
Number of students			-.00	.01	-.02	.02		
Student-student interaction			-.02**	.02	-.06**	.02		
Number of friends going to attend Gymnasium			-.11 **	.02	-.08**	.02		
Parent-school interaction			-.18 **	.19	-.14**	.04		
Educational background: Gymnasium					-.38**	.04		
Socio-economic position			-.01**		.00			
Migration background			.28**		.05			
Random Part								
Level 1: Var (1)	.097	.01	.088	.01	.099	.01	.093	.01
Level 2: Var (1)	.504	.03	.395	.00	.335	.00	.297	2.45
Level 3: Var (1)	.035	.01	.062	.01	.055	.03	.067	.09
Level 2: Var (2)			.049	.00	.040	.01	.060	.12
Level 3: Var (2)			.065	.00	.072	.03	.062	.08
n of level 1 units = 1534, n of level 2 units = 1106, n of level 3 units = 89								
Deviance	3103.5		3107.1		3029.9		2827.9	
AIC	3111.5		3121.1		3053.9		2857.9	

** p < .01; * p < .05; + p < .10

Model 2 contains the indicators for social relations. Here we observe an improvement of children's GPA due to their individual social capital. Effects are found for good interactions between student and teacher, student and student, as well as parent and school. Also, the number of friends planning to attend *Gymnasium* is positively related to an improvement in grade level.

These results answer one of our main research questions, that is, whether changes in social relations are important for academic success. Children whose relations to their teachers and classmates are strong and close, and children whose parents show an increasing engagement for school issues have better chances to reach a high level of performance. The number of students in class has no significant effect on the development of students' performance.

When additionally considering students' family background characteristics (model 3), we can observe the expected effects: Children from a privileged social background and without migration background have higher chances of improving their grade level. Consequently, indicators for social capital as well as for the familial background predict the competence level not only in our cross-sectional analyses, as shown in chapter 4.1, but also over time. Good social relations between the children and their classmates, children and their teachers as well as between parents and teachers are related to a positive development of children's competencies.

5. Conclusion

According to Coleman (1982, 1987), social capital, in terms of social relations between family and school, has an influence on academic success. Our analyses confirm existing research on the relevance of social capital for the German education system with cross-sectional as well as longitudinal models. It is evident that the quality of social relations is not generally bound to economic resources, human capital, or migration background and therefore exerts own explanatory power with respect to academic success. Coleman's assumption of independent effects of social relations as important resources of the household could be confirmed. Children from non privileged backgrounds can profit from close social relationships. In addition, longitudinal data offer the opportunity to empirically model causal relationships and thereby allow providing evidence for the argument of social relations as being important for academic achievement. Solving the crucial question of causality by controlling former academic success is a possibility to show that social relations have a direct effect on reaching a certain performance level and that the mechanism is not reversed. The advantage of using longitudinal data is not exclusively a methodological one, but also offers the opportunity to analyze effects of changes in social relations. Therefore, not only cross-sectional methods are included, but also longitudinal ones that consider changes over time, which can take into account the proximity of the time of the crucial transition to secondary school.

In our analyses, we can confirm Coleman's theoretical assumptions: Strong and close relations between the actors in a defined field of action influence valuable outcomes. In this case, close relations between children and parents and their academic environment influence grades in a positive way. Children with engaged parents have better chances to reach high grade levels, which allow for a transition to the academic, *Gymnasium* track. The underlying theoretical assumption is that parents with close contact to school know other students' parents and have better contact to their children's teachers. By engaging in school activities and issues, similar norms and values about education are established. For Coleman, these shared norms and values, as well as keeping close contacts to each other, characterize a kind of social network that produces social capital. Furthermore, these contacts offer the possibility to help and support each other. As a future research ques-

tion, these relationships should be investigated using more precise indicators to operationalize these assumptions explicitly. These analyses, however, are not possible on basis of our current dataset. In addition, future analyses could also consider other indicators: While findings of other research using the same indicators are in line with our results, future analyses should also test different indicators to handle the somehow inconsistent results of previous studies. Nevertheless, it was possible for us at this point to examine whether a change in the home-school engagement considered in our analyses has any effect on achieving good grades. We can show that significant changes in parental engagement affect their children's chances to attain better grades. This emphasizes the importance of close social relations.

In addition we found that not only the parents' social relations do matter, but also the children's contacts to their classmates and their teachers, as they foster exchanging information and supporting each other. Children who get along well with other students and their teachers – as an indicator of the closeness of relations – have higher chances to attain better grade levels. Moreover, effects of intensified relations could also be shown for the contact between students and teachers and among the students themselves. This finding underlines the proposed significance of social capital and the importance of Coleman's theoretical assumptions, and it is in line with previous research on class climate which applies the same scales. From our analyses we can also draw the conclusion that next to the climate within class also shared norms about education are important: Children with high performing friends have higher chances for academic success. Future research should retest our findings with more indicators and a main emphasis on the class climate. Still, one advantage of the used data was the availability of information provided by the children themselves and not only by the parents, presumably reflecting their own intentions and perceptions. Another indicator we considered was the number of children in class. Our intention was to investigate by including this indicator, whether the opportunities to interact in class exert an additional influence on school achievement. It could be shown that the number of students has no significant effect on attaining a certain grade level. We could not confirm the assumption that smaller numbers of children in class lead to more intense contacts between teachers and students and among students, leading to closer and stronger social relations.

Despite the limitations of the applied indicators, we can conclude that social relations – independent from other household resources – are important for attaining grade levels that in turn are relevant for the transition to a certain track of secondary school. However, it matters which social relation is considered: The quality of the child-to-child interaction is more important when comparing a high and low levels of performance. The interactions between students and teachers as well as between parents and school, however, are of greater importance when comparing academic achievement in terms of grades that allow a transition to the intermediate school track as opposed to the academic track.

All in all, the level of social relations at the end of primary education as a decisive point in the German education system is important for children's school per-

formance, as is a positive change in these relations. This implies that it is not only worthwhile to use longitudinal data for methodological reasons, but just as much with regard to changes relevant in theoretical terms. Our analyses leave room for future studies that further our understanding of the underlying mechanisms and to provide further answers to the question of causality regarding the ties between family-school relations and academic success.

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Monja Schmitt, Soziologin M.A., Wissenschaftliche Mitarbeiterin im Projekt BiKS, Universität Bamberg;
E-Mail: monja.schmitt@uni-bamberg.de

Lydia Kleine, Dipl.-Soziologin, Wissenschaftliche Mitarbeiterin im Projekt BiKS, Universität Bamberg;
E-Mail: lydia.kleine@uni-bamberg.de